AMENDMENTS TO THE SPECIFICATION

Please amend the paragraph beginning at page 8, line 6 as follows:

FIGS. 3(a) to ~~(d)~~(c) show the procedures of the normalization process of a slanted iris image.

Please insert the following paragraphs after the last paragraph on page 11:

Finally, at step 160, if the iris in the acquired eye image has been rotated at an arbitrary angle with respect to a centerline of the iris, the arrays of pixels of the iris image information are moved and compared in order to correct the rotated iris image.

FIGS. 4 (a) to (b) show a rotated iris image resulting from the tilting of the user's head. Upon acquisition of an iris image, the user's head may be tilted a little toward the left or right, under which if the iris image is acquired, the rotated iris image is obtained as shown in FIG. 4 (a). That is, if the eye image acquired at step 110 has been rotated at an arbitrary angle with respect to a centerline of the eye, a process of correcting the rotated image is required. FIG. 4 (a) shows the iris image rotated by about 15 degrees in a clockwise or counterclockwise direction with respect to the centerline of the eye. When the rotated iris image is converted into an image in the polar coordinates, the iris patterns in the converted image are shifted leftward or rightward as shown in FIG. 4 (b), as compared with the normal iris pattern.

FIGS. 5 (a) and (b) show procedures of the process of correcting the rotated iris image shown in FIGS. 4 (a) and (b). The process of correcting the rotated iris image, which has resulted from the tilting of the user's head, by comparing and moving the arrays of the iris image information will be described below with reference to FIGS. 5 (a) and (b).

Referring to FIG. 5 (a), from the rotated iris image resulting from the tiling of the user's head, a plurality of arrays Array(n) of the iris image are temporarily generated by means of shifts by an arbitrary angle with respect to an Array(0) of the converted iris image in the polar coordinates. That is, by shifting columns leftward or rightward of the Array(0) based on the Array(0) of the converted iris image in the polar coordinates, 20 arrays of image information from Array(0) to Array(-10) and from Array(0) to Array(10) are temporarily generated.

In order to generate characteristic vectors of the iris corresponding to the plurality of arrays of iris image that have been temporarily generated, wavelet transform is performed. The respective characteristic vectors generated by the

wavelet transform are compared with previously registered characteristic vectors to obtain similarities. A characteristic vector corresponding to the maximum similarity among the obtained similarities is accepted as the characteristic vector of the user.

In other words, by generating the arrays Array(n) of image information on the rotated image as mentioned above and performing the wavelet transform for the respective arrays of the image information as shown FIG. 5 (b), the characteristic vectors $f_T(n)$ of the iris corresponding to the temporarily generated plurality of arrays Array(n) of the iris image are then generated. The characteristic vectors $f_T(n)$ are generated from $f_T(0)$ to $f_T(10)$ and from $f_T(0)$ to $f_T(-10)$. The respective generated characteristic vectors $f_T(n)$ are compared with each of the characteristic vectors f_R of the enrollees and thus similarities S_n are obtained. A characteristic vector $f_T(n)$ corresponding to the maximum similarity among the obtained similarities S_n is considered as a resulted value in which the rotation effect is corrected, and is accepted as the characteristic vector of the user's iris.

As described above, according to the non-contact type human iris recognition method by the correction of the rotated iris image of the present invention, there is an advantage in that by detecting the inner and outer boundaries of the iris using the differences in pixels of the Canny edge detector and the image, the boundaries of the iris can be more correctly detected from the eye image of the user.

Furthermore, according to the non-contact type human iris recognition method of the present invention, if the iris in the eye image acquired by the image acquisition equipment has been rotated at an arbitrary angle with respect to the centerline of the iris, the rotated iris image is corrected into the normal iris image. Otherwise, if a lower portion of the converted iris image in the polar coordinates is curved and thus has an irregular shape due to the acquisition of the slanted iris image, the iris image is normalized in predetermined dimensions. Thus, there is another advantage in that the iris image with a variety of deformation is processed into data on a correct iris image so as to markedly reduce a false acceptance rate and a false rejection rate.

It should be noted that the above description merely exemplifies embodiments of the non-contact type human iris recognition method by the correction of the rotated iris image according to the present invention, and thus, the present invention is not limited to the above embodiments. A person skilled in the art can make various modifications and changes to the present invention without departing from the technical spirit and scope of the present invention defined by the appended claims.